REMARKS

Applicants note that the Restriction Requirement indicates that Claims 1-97 are pending in the application and that the PAIR File Contents History for this application does not indicate receipt of a Preliminary Amendment and an Information Disclosure Statement that were mailed to the USPTO on March 1, 2002 via First Class Mail. A copy of the Preliminary Amendment and Information Disclosure Statement are included herewith. Applicants' election of species in response to the Restriction Requirement is made with the assumption that the amendments proposed in the Preliminary Amendment have been entered. If those amendments have not been entered, Applicants respectfully request that the Examiner enter those amendments prior to the consideration of the response to the Restriction Requirement.

Claims 2-97 are pending in the application, Claim 1 having been cancelled by the Preliminary Amendment dated March 1, 2002. Claims 2, 6, 11, 19, 21, 37, 43, 46, 54, 62, 64, 72, 73, 76, 86, 93, and 95 are amended herein. Claims 23-30, 44, 54, 65, 66, 70, 71, 74, 88, and 89 are withdrawn. Applicants also add Claim 98 to the present application.

The Restriction Requirement dated October 1, 2003 requires the Applicants to elect a single disclosed species for prosecution under 35 U.S.C. § 121 and indicates that Claims 1, 37, and 95 are generic. The species for election are defined as follows:

For transition metal (M^1) of the active material: Ti; V; Cr or Mo; Mn; and Fe, Ni or Co.

For the dopant metal of the active material: Li; Mg, Ca, Sr, or Ba; Te; Ti or Zr; Mo; and Co or Ru.

For the metal of the ionically conductive lithium oxide: Al; Sn, Si or Ge; Te; Ti, Hf or Zr; Mo; Mn; Ru.

Applicants hereby elect the following species:

For the transition metal M^1: Fe, Ni, and Co;

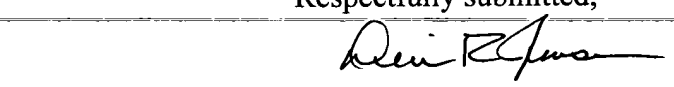
For the dopant metal: Ti and/or Zr; and

For the metal of the ionically conductive lithium oxide M^2: Ti, Hf, and Zr.

Claims 2-22, 31-43, 45-53, 54-64, 67-69, 72, 73, 75-87, and 90-98 generally read on the elected species. Claims 23-30, 44, 54, 65, 66, 70, 71, 74, 88, and 89 are withdrawn as reading on non-elected species with the understanding that the withdrawn claims will be entitled to consideration upon the allowance of any generic Claims, including Claims 1, 37, and 95.

Applicant respectfully submits that this application is now in condition for substantive examination, which action is requested. If any extension of time for the accompanying response or submission is required, Applicant requests that this be considered a petition therefor. The Commissioner is hereby authorized to charge any additional fee, which may be required, or credit any refund, to our Deposit Account No. 50-0220. Any questions that the Examiner may have about the foregoing may be directed to the undersigned, who can be reached at 919-854-1400.

Respectfully submitted,



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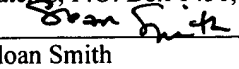
CERTIFICATE OF EXPRESS MAILING

"Express Mail" mailing label number: EV318417988US Date of Deposit: December 1, 2003
I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.



Sloan Smith

Attorney's Docket No. 30208.240386

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Gao et al.
Appl. No.: 10/040,047
Filed: October 29, 2001
For: POSITIVE ELECTRODE ACTIVE MATERIALS FOR SECONDARY BATTERIES AND METHODS OF PREPARING SAME

Confirmation No.: 1829
Group Art Unit: 1741

March 1, 2002

Commissioner for Patents
Washington, DC 20231

PRELIMINARY AMENDMENT

Sir:

Please amend the above-identified application as follows:

In the Claims:

Please cancel Claim 1, without prejudice.

2. (Rewritten) A positive electrode active material for secondary lithium and lithium-ion batteries comprising:

at least one electron conducting compound having the formula $LiM^1_{x-y}\{A\}_yO_z$ wherein M^1 is a transition metal; {A} is represented by the formula Σw_iB_i wherein B_i is an element other than M^1 used to replace the transition metal M^1 and w_i is the fractional amount of element B_i in the total dopant combination such that $\Sigma w_i = 1$; B_i is a cation in $LiM^1_{x-y}\{A\}_yO_z$; $0.95 \leq x \leq 1.05$; $0 \leq y \leq x/2$; and $1.90 \leq z \leq 2.10$; and

at least one electron insulating and lithium ion conducting lithium metal oxide selected from the group consisting of $LiAlO_2$ and $Li_2M^2O_3$, wherein M^2 is at least one tetravalent metal selected from the group consisting of Ti, Zr, Mn, Mo, Si, Ge, Hf, Ru and Te.

5. (Amended) The positive electrode active material according to Claim 2, comprising from greater than or equal to 95% by weight and less than 100% by weight of $LiM^{1}_{x-y}\{A\}_yO_z$ and greater than 0% by weight and less than or equal to 5% by weight of the lithium metal oxide.

6. (Amended) The positive electrode active material according to Claim 2, wherein M^1 is selected from the group consisting of Co, Ni, Mn and Ti.

7. (Amended) The positive electrode active material according to Claim 2, wherein x=1 and z=2.

10. (Amended) The positive electrode active material according to Claim 2, wherein $y > 0$.

18. (Amended) The positive electrode active material according to Claim 2, wherein x, y and z are values that provide a stable lithium metal oxide compound.

25. (Amended) The positive electrode active material according to Claim 2, wherein the $LiM^{1}_{x-y}\{A\}_yO_z$ compound has the formula $LiNi_{1-y}Co_aM^3_bM^4_cO_2$, wherein M^3 is selected from the group consisting of Ti, Zr, and combinations thereof; M^4 is selected from the group consisting of Mg, Ca, Sr, Ba, and combinations thereof; $y=a+b+c$, $0 < y \leq 0.5$; $0 < a < 0.5$; $0 < b \leq 0.15$; and $0 < c \leq 0.15$.

31. (Amended) The positive electrode active material according to Claim 2, further comprising at least one electron insulating and lithium-ion conducting metal oxide.

32. (Amended) The positive electrode active material according to Claim 31, wherein the metal oxide has the formula MO_2 wherein M is at least one tetravalent metal selected from the group consisting of Ti, Zr, Mo, Si, Ge, Hf, Ru and Te.

35. (Amended) A positive electrode for a secondary lithium or lithium-ion battery comprising the positive electrode active material of Claim 2, a carbonaceous material and a polymer binder.

36. (Amended) A secondary lithium or lithium-ion battery comprising a positive electrode, a negative electrode and a nonaqueous electrolyte, wherein the positive electrode includes the positive electrode active material of Claim 2.

37. (Amended) A positive electrode active material for secondary lithium and lithium-ion batteries comprising at least one compound of the formula $LiM^1_{x-y}\{A\}_yO_z$ and at least one lithium metal oxide selected from the group consisting of $LiAlO_2$ and $Li_2M^2O_3$, wherein M^1 is a transition metal, M^2 is at least one tetravalent metal selected from the group consisting of Ti, Zr, Mn, Mo, Si, Ge, Hf, Ru and Te, {A} is represented by the formula Σw_iB_i wherein B_i is an element other than M^1 used to replace the transition metal M^1 and w_i is the fractional amount of element B_i in the total dopant combination such that $\Sigma w_i = 1$; B_i is a cation in $LiM^1_{x-y}\{A\}_yO_z$; $0.95 \leq x \leq 2.10$; $0 \leq y \leq x/2$; and $1.90 \leq z \leq 4.20$.

57. (Amended) The positive electrode active material according to Claim 56, wherein the metal oxide has the formula MO_2 wherein M is at least one tetravalent metal selected from the group consisting of Ti, Zr, Mo, Si, Ge, Hf, Ru and Te.

62. (Amended) A method of preparing a positive electrode active material for secondary lithium and lithium-ion batteries, the positive electrode active material including separate lithium metal oxide phases corresponding to the formulas $LiM^1_{x-y}\{A\}_yO_z$ and $Li_2M^2O_3$ or $LiAlO_2$, comprising the steps of:

intimately mixing source compounds containing M^1, Li and optionally {A} in amounts sufficient to provide a stoichiometric relationship between M^1, Li and {A} corresponding to the formula $LiM^1_{x-y}\{A\}_yO_z$ wherein M^1 is a transition metal, {A} is represented by the formula

$\Sigma w_i B_i$ wherein B_i is an element other than M^1 used to replace the transition metal M^1 and w_i is the fractional amount of element B_i in the total dopant combination such that $\Sigma w_i = 1$; B_i is a cation in $LiM^1_{x-y}\{A\}_yO_z$; at least one of M^1 and B_i is selected from the group consisting of Ti, Zr, Mn, Mo, Si, Al, Ge, Hf, Ru and Te; $0.95 \leq x \leq 2.10$; $0 \leq y \leq x/2$; and $1.90 \leq z \leq 4.20$;

firing the mixture in the presence of oxygen at an initial firing temperature and optionally one or more additional firing temperatures, at least one of said initial firing temperature and optionally one or more additional firing temperatures being the maximum firing temperature and at least one of said initial firing temperature and optionally one or more additional firing temperatures being between about 700°C and about 1000°C, wherein said firing step comprises heating the mixture at a sufficiently slow rate from 500°C to the maximum firing temperature to produce separate lithium metal oxide phases including $LiM^1_{x-y}\{A\}_yO_z$ and $LiAlO_2$ or $Li_2M^2O_3$, wherein M^2 is one of M^1 and B_i, and M^2 is selected from the group consisting of Ti, Zr, Mn, Mo, Si, Ge, Hf, Ru and Te; and

cooling the $LiM^1_{x-y}\{A\}_yO_z$ and $Li_2M^2O_3$ or $LiAlO_2$ compounds.

64. (Amended) The method according to Claim 62, wherein said firing step comprises heating the mixture at a sufficiently slow rate from 500°C to the maximum firing temperature to produce separate lithium metal oxide phases including $LiM^1_{x-y}\{A\}_yO_z$, $Li_2M^2O_3$ and M^2O_2, wherein one of M^1 and B_i is M^2 and M^2 is selected from the group consisting of Ti, Zr, Mo, Si, Ge, Hf, Ru and Te.

70. (Amended) The method according to Claim 62, wherein one of M^1 and B_i is selected from the group consisting of Ti, Zr, Mn, Mo, Si, Ge, Hf, Ru and Te.

REMARKS

Applicants have amended Claims 2, 5-7, 10, 18, 25, 31-32, 35-37, 57, 62, 64 and 70 and cancelled Claim 1 as shown herein. Applicants respectfully submit that the claim amendments are supported by the specification and request entry of same.

Applicants respectfully submit that all the claims are in condition for allowance. Accordingly, a Notice of Allowance is respectfully requested in due course. If any minor informalities need to be addressed, the Examiner is directed to contact the undersigned attorney by telephone to facilitate prosecution of this case.

Respectfully submitted,

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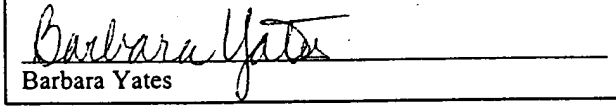
CERTIFICATE OF MAILING

I hereby certify that this paper or fee is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents, Washington, DC 20231 on March 1, 2002.



Barbara Yates

Version with Markings to Show Changes Made:

In the Claims:

Please cancel Claim 1, without prejudice.

2. (Rewritten) A [The] positive electrode active material [according to Claim 1,] for secondary lithium and lithium-ion batteries comprising:

at least one electron conducting compound having the formula $LiM^1_{x-y}\{A\}_yO_z$ wherein M^1 is a transition metal; {A} is represented by the formula Σw_iB_i wherein B_i is an element other than M^1 used to replace the transition metal M^1 and w_i is the fractional amount of element B_i in the total dopant combination such that $\Sigma w_i = 1$; B_i is a cation in $LiM^1_{x-y}\{A\}_yO_z$; $0.95 \leq x \leq 1.05$; $0 \leq y \leq x/2$; and $1.90 \leq z \leq 2.10$; and

at least one electron insulating and lithium ion conducting lithium metal oxide [wherein the lithium metal oxide is] selected from the group consisting of $LiAlO_2$ and $Li_2M^2O_3$, wherein M^2 is at least one tetravalent metal selected from the group consisting of Ti, Zr, [Sn,] Mn, Mo, Si, Ge, Hf, Ru and Te.

5. (Amended) The positive electrode active material according to Claim [1] 2, comprising from greater than or equal to 95% by weight and less than 100% by weight of $LiM^1_{x-y}\{A\}_yO_z$ and greater than 0% by weight and less than or equal to 5% by weight of the lithium metal oxide.

6. (Amended) The positive electrode active material according to Claim [1] 2, wherein M^1 is selected from the group consisting of Co, Ni, Mn and Ti.

7. (Amended) The positive electrode active material according to Claim [1] 2, wherein x=1 and z=2.

10. (Amended) The positive electrode active material according to Claim [1] 2,

wherein $y > 0$.

18. (Amended) The positive electrode active material according to Claim [1] 2, wherein x, y and z are values that provide a stable lithium metal oxide compound.

25. (Amended) The positive electrode active material according to Claim [1] 2, wherein the $LiM^1_{x-y}\{A\}_yO_z$ compound has the formula $LiNi_{1-y}Co_aM^3_bM^4_cO_2$, wherein M^3 is selected from the group consisting of Ti, Zr, and combinations thereof; M^4 is selected from the group consisting of Mg, Ca, Sr, Ba, and combinations thereof; $y=a+b+c$, $0 < y \leq 0.5$; $0 < a < 0.5$; $0 < b \leq 0.15$; and $0 < c \leq 0.15$.

31. (Amended) The positive electrode active material according to Claim [1] 2, further comprising at least one electron insulating and lithium-ion conducting metal oxide.

32. (Amended) The positive electrode active material according to Claim 31, wherein the metal oxide has the formula MO_2 wherein M is at least one tetravalent metal selected from the group consisting of Ti, Zr, [Sn,] Mo, Si, Ge, Hf, Ru and Te.

35. (Amended) A positive electrode for a secondary lithium or lithium-ion battery comprising the positive electrode active material of Claim [1] 2, a carbonaceous material and a polymer binder.

36. (Amended) A secondary lithium or lithium-ion battery comprising a positive electrode, a negative electrode and a nonaqueous electrolyte, wherein the positive electrode includes the positive electrode active material of Claim [1] 2.

37. (Amended) A positive electrode active material for secondary lithium and lithium-ion batteries comprising at least one compound of the formula $LiM^1_{x-y}\{A\}_yO_z$ and at least one lithium metal oxide selected from the group consisting of $LiAlO_2$ and $Li_2M^2O_3$, wherein M^1 is a

transition metal, M^2 is at least one tetravalent metal selected from the group consisting of Ti, Zr, [Sn,] Mn, Mo, Si, Ge, Hf, Ru and Te, {A} is represented by the formula $\Sigma w_i B_i$ wherein B_i is an element other than M^1 used to replace the transition metal M^1 and w_i is the fractional amount of element B_i in the total dopant combination such that $\Sigma w_i = 1$; B_i is a cation in $LiM^1_{x-y}\{A\}_yO_z$; $0.95 \leq x \leq 2.10$; $0 \leq y \leq x/2$; and $1.90 \leq z \leq 4.20$.

57. (Amended) The positive electrode active material according to Claim 56, wherein the metal oxide has the formula MO_2 wherein M is at least one tetravalent metal selected from the group consisting of Ti, Zr, [Sn,] Mo, Si, Ge, Hf, Ru and Te.

62. (Amended) A method of preparing a positive electrode active material for secondary lithium and lithium-ion batteries, the positive electrode active material including separate lithium metal oxide phases corresponding to the formulas $LiM^1_{x-y}\{A\}_yO_z$ and $Li_2M^2O_3$ or $LiAlO_2$, comprising the steps of:

intimately mixing source compounds containing M^1, Li and optionally {A} in amounts sufficient to provide a stoichiometric relationship between M^1, Li and {A} corresponding to the formula $LiM^1_{x-y}\{A\}_yO_z$ wherein M^1 is a transition metal, {A} is represented by the formula $\Sigma w_i B_i$ wherein B_i is an element other than M^1 used to replace the transition metal M^1 and w_i is the fractional amount of element B_i in the total dopant combination such that $\Sigma w_i = 1$; B_i is a cation in $LiM^1_{x-y}\{A\}_yO_z$; at least one of M^1 and B_i is selected from the group consisting of Ti, Zr, [Sn,] Mn, Mo, Si, Al, Ge, Hf, Ru and Te; $0.95 \leq x \leq 2.10$; $0 \leq y \leq x/2$; and $1.90 \leq z \leq 4.20$;

firing the mixture in the presence of oxygen at an initial firing temperature and optionally one or more additional firing temperatures, at least one of said initial firing temperature and optionally one or more additional firing temperatures being the maximum firing temperature and at least one of said initial firing temperature and optionally one or more additional firing temperatures being between about 700°C and about 1000°C, wherein said firing step comprises heating the mixture at a sufficiently slow rate from 500°C to the maximum firing temperature to produce separate lithium metal oxide phases including $LiM^1_{x-y}\{A\}_yO_z$ and $LiAlO_2$ or $Li_2M^2O_3$, wherein M^2 is one of M^1 and B_i, and M^2 is selected from the group consisting of Ti, Zr, [Sn,]

Mn, Mo, Si, Ge, Hf, Ru and Te; and

cooling the $LiM^1_{x-y}\{A\}_yO_z$ and $Li_2M^2O_3$ or $LiAlO_2$ compounds.

64. (Amended) The method according to Claim 62, wherein said firing step comprises heating the mixture at a sufficiently slow rate from 500°C to the maximum firing temperature to produce separate lithium metal oxide phases including $LiM^1_{x-y}\{A\}_yO_z$, $Li_2M^2O_3$ and M^2O_2, wherein one of M^1 and B_i is M^2 and M^2 is selected from the group consisting of Ti, Zr, [Sn,] Mo, Si, Ge, Hf, Ru and Te.

70. (Amended) The method according to Claim 62, wherein one of M^1 and B_i is selected from the group consisting of Ti, Zr, [Sn,] Mn, Mo, Si, Ge, Hf, Ru and Te.

Attorney's Docket No. 30208.240386

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Gao et al.
Appl. No.: 10/040,047 Group Art Unit: 1741
Filed: October 29, 20021 Confirmation No.: 1829
For: POSITIVE ELECTRODE ACTIVE MATERIALS FOR SECONDARY BATTERIES AND METHODS OF PREPARING SAME

March 1, 2002

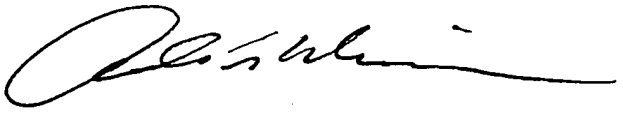
Commissioner for Patents
Washington, DC 20231

INFORMATION DISCLOSURE STATEMENT
CITATION UNDER 37 C.F.R. § 1.97

Sir:

Attached is a list of documents on form PTO-1449 together with a copy of each identified document. It is requested that the Examiner consider these documents and officially make them of record in accordance with the provisions of 37 C.F.R. § 1.97 and Section 609 of the MPEP. By submitting the listed documents, Applicant in no way makes any admission as to the prior art status of the listed documents, but is instead submitting the listed documents for the sake of full disclosure.

Respectfully submitted,



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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner For Patents, Washington, DC 20231, on March 1, 2002.

Barbara Yates

Barbara Yates

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	10/040,047
Filing Date	October 29, 2001
First Named Inventor	Gao et al.
Group Art Unit	1741
Examiner Name	Unknown
Attorney Docket Number	30208.240386

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.	U.S. Patent Document Number	Kind Code (if known)	Name of Patentee or Applicant Of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages of Relevant Figures Appear
	1	6,270,927		Nakane et al.	08/07/2001	

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document Office	Number	Kind Code (if known)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T

Examiner Signature		Date Considered	

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Attorney Docket No. 208.6164

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Gao et al.
Serial No.: 10/040,047 Group Art Unit: 1745
Filed: February 1, 2002 Examiner: Kalafut, Stephen J.
For: *Positive Electrode Active Materials for Secondary Batteries and Methods of Preparing Same*

Date: December 1, 2003

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PETITION AND FEE FOR EXTENSION OF TIME
(37 C.F.R. § 1.136(a))

1. This is a petition for an extension of time for a total period of one (1) month to respond to the Restriction Requirement dated October 1, 2003.

2. A response in connection with the matter for which this extension is requested:

☒ is filed herewith.

☐ has been filed.

3. Applicant:

☐ Claims small entity status. See 37 CFR 1.27.

☒ Does not claim small entity status.

4. Calculation of extension fee (37 C.F.R. § 1.17(a)-(d)):

	Total Months Requested	Fee For Other Than Small Entity	Fee for Small Entity
☒	one month	$110.00	$55.00
☐	two months	$420.00	$210.00
☐	three months	$950.00	$475.00
☐	four months	$1,480.00	$740.00
☐	five months	$2,010.00	$1,005.00

Fee $110.00

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card (Form PTO-2038) is enclosed.

☒ Charge Deposit Account No. 50-0220 for any additional extension and/or fee required or credit for any excess fee paid.

Respectfully submitted,

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Registration No. 44,805

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CERTIFICATE OF EXPRESS MAILING

"Express Mail" mailing label number: EV318417988US Date of Deposit: December 1, 2003
I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Sloan Smith